Peer Review of Proposed Basin Plan Amendments to Add Water Quality Objectives for Chloroform, Chlorodibromomethane, and Dichlorobromomethane for New Alamo and Ulatis Creeks and Permit Implementation Provisions

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I am writing this report in my capacity as an ScD in Biostatistics and a Professor of Statistics at the University of Florida. My comments will mainly focus on the statistical modeling and use of the data as it pertains to the questions of interest.

1. The proposed site-specific objectives provide adequate protection of human health

   One of the key assumptions is that the lower segments of New Alamo Creek and Ulatis Creek are not REASONABLY expected to be used as the primary drinking water supply for people during their lifetime. This is documented in the report. All the proposed alternatives rely on this assumption.

   The USEPA allows range in risk levels of 10^{-6} to 10^{-4} for human health criteria as long as the most highly exposed populations groups do not exceed a 10^{-4} risk level.

   In general, Alternatives 1, 2, and 3 appear to be unnecessarily strict given the current and expected use of lower New Alamo Creek and Ulatis Creek. The lowest of these restrictions is Alternative 3 which gives a risk level of 10^{-5} again under unrealistically large assumptions about consumption.

   The risk calculations for Alternative 4A result in incremental cancer risks between $10^{-4.95}$ and $10^{-5.38}$ under the assumption of 2 L/day of water and up to 17.5 g/day of fish/shellfish from the segments. For Alternative 4B, the incremental cancer risks are between $10^{-4.55}$ and $10^{-4.91}$ under the same consumption assumption. Thus, as pertains to the magnitude of consumption assumption, the risk calculations are conservative.

   However, I would like to point out some minor issues with the concentration data used for the calculations of risk. In the report, the contributors fit normal and lognormal distributions for measured data for each THM at each location. The assumption of a lognormal distribution seems appropriate given the data and the desire to have a parametric distribution to estimate the upper percentiles. However, given the lack of data for Brown Alamo Dam relative to End of Old Alamo Creek, should some sort of adjustment be made to account for the 'oversampling' of the smaller values which appears to have occurred? For example, trying to 'impute' the Brown Alamo Dam data from the End of Old Alamo Creek data? In addition, is it better to weight recent data more than past data? This might be of importance if any (increasing) trend is observed from 2002 to 2007. Also, is there a need to 'adjust' the data for seasonality (e.g., monthly effects) since there was imbalance in terms of months measured (at Brown-Alamo Dam) during the period from 4/2003 to 8/2007 (as seen in Table A-4). I wonder how these sort of adjustments might impact the estimates of the highest percentiles in Table B.4 (and then the corresponding cancer risk (CR))? These would be most relevant for Alternatives 2-4A. For Alternative 4B, several of these issues are less relevant given the richer concentration data at the terminus of OAC.

   So in sum, for the risk assessment conducted under Alternatives 4A and 4B (which are the most practical), how much would modified estimates of the concentration (as discussed above), impact the risk levels? These issues should be able to be addressed with minimal difficulty.

2. The approach to determining 'reasonable potential' would be appropriate and effective in determining whether point source discharges into Old Alamo Creek (a water body for which

MUN is not a designated beneficial use) have reasonable potential to cause or contribute to an excursion above the site-specific THM objectives within segments.

The approach appears to be 'reasonable' subject to the minor concerns in my response to calculations in Questions 1 and 3. Most of the concerns regarding statistical modeling and estimation are of much less concern for Alternative 4B which uses the richer data at the terminus of Old Alamo Creek (OAC). And the policy of (at a minimum) twice monthly monitoring of effluent and of the terminus of OAC between November and March would be appear to be a sufficient monitoring approach.

3. The 'attenuation factor' as proposed, is a technically sound approach to derive the effluent limits, which apply to discharges into Old Alamo Creek, from the site-specific objectives applicable to the lower segments of New Alamo Creek and Ulatis Creek.

   Alternatives 2, 3, and 4A measure pollutants at Brown-Alamo Dam (BAD) with background ambient levels measured at Lewis Road at New Alamo Creek. Alternative 4B measures at the terminus of Old Alamo Creek (OAC), also with background ambient levels measured at Lewis Road at New Alamo Creek.

   The attenuation factor is defined as the median of the individual sample attenuation values between the effluent discharge location and the Brown-Alamo Dam derived from all representative historical data (for Alternatives 2, 3, and 4A). There are several issues here:

   (a) To calculate individual values, the values at discharge location and Brown-Alamo Dam are recorded on the same day. Is this the best way to 'measure' the attenuation? That is, given the variability in concentrations at the two locations, given the time for the 'water' and pollutants to travel, etc., should they be computed this way? An expert in water dynamics might easily refute this concern.

   (b) Is the attenuation factor (in principle), constant given the original concentration? Given the lack of larger values in the Brown-Alamo Dam data, if the attenuation factor increased with 'baseline' concentration, the estimate could be biased low. It would be important to assess this. This is less of an issue with Alternative 4B given the more 'dense' data at the terminus of OAC.

   (c) Similar to my earlier comments on risk calculations in Question 1, should some sort of weighting be used to have more recent data 'count more' in computing the attenuation factor?

   (d) The 'missing' larger values at Brown Alamo Dam (BAD) could impact computation of mean and sd for the AMEL and MDEL multipliers.

   (e) It is not clear what data will be used for the attenuation factor in this monitoring: will it be 1) previous year's data? 2) previous x years of data? (if so , what is 'x')? 3) most recent of each month (November through March)? This should be clarified in the regulations and relevant issues above addressed (depending on which of options 1-3 used).

   The authors of the report state that one reason for preferring Alternative 4B over 4A (in terms of the location) would be that Alternative 4B addresses the dilution credit and ambient

background concentration according to SIP procedures rather in the attenuation factor as the other alternatives do. Another reason is that the concentration distribution at the terminus OAC used for Alternative 4B has less issues than corresponding distribution at BAD used for other Alternatives (in particular, for 4A). As such, the proposed plan for monitoring (twice monthly at the terminus of OAC) would appear to be the best approach to calculating the attenuation factor and would minimize the (minor) concerns stated above.

Summary

The staff recommends Alternative 4B. By using this alternative (and monitoring at the terminus of Old Alamo Creek) the largest available historical monitoring data can be utilized which lessens many of the (minor) concerns discussed above. In any case, the issues discussed above could be addressed (with minimal difficulty) via some additional sensitivity analyses.

I concur with the staff recommendation of Alternative 4B and in my expert opinion, this amendment will provide adequate protection of human health.